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SYSTEM AND METHOD FOR DISTRIBUTING AIRLINE INFORMATION TO  
CLOSED USER GROUPS

- 5 This invention relates to the provision of supplementary telecommunications services, and more particularly, to a new type of solution for distributing information to closed user groups. The invention also relates to a new type of arrangement for airline information distribution.
- 10 The solution according to the invention can be used as a service solution in telecommunication networks.

In a modern world people are communicating with each other more often and this development is steadily increasing.

- 15 The methods of communication have also changed. For instance, the use of SMS-messages (SMS, Short Message Service) has rapidly increased. The demand for new types of communication services and applications is clearly visible.

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People nowadays have busier schedules and the communication with different parties is done more rapidly and altogether in a more efficient manner. All in all people like to get different notification information

25 immediately, whether or not they are in or out of the office. People are also more used to communicating with different devices.

- 30 A growing number of people move and travel around a lot in their work. These people especially require that these different forms of information reach them as soon as possible.

- 35 From the side of different service providers there can be situations where a certain closed user group should be notified for one reason or another. Delays and late notifications decrease the level of service and also put

demands on personnel with regard to the handling of customers.

There has not been a good solution for solving these  
5 problems so far. There is an increasing demand for a  
solution for distributing information to closed user  
groups.

The above problems exist especially in regard to airline  
10 services. Travellers are usually very hard to reach in the  
case of changed flight departures or flight cancellations.  
Customers are often very frustrated with flight changes  
and even more so when they receive the information too  
late. The airlines have been demanding for an information  
15 distribution solution to be developed that could overcome  
these defects and that would provide a service of good  
quality.

There are prior art solutions for distributing information  
20 to a user by means of message-distributing systems, among  
others deploying e-mail applications, based on wireless-or  
wireline networks, mentioned in patent applications WO-A-  
98 03005 and EP-A-0 836 301.

In patent application WO-A-98 03005, a method is disclosed  
25 where a subscriber to a telephone operator can change  
his/her personal settings concerning mail service, GSM  
service, voice-mail service, IN service or another  
service. In patent application EP-A-0 836 301, an e-mail  
paging system is disclosed, where incoming usefull e-mails  
30 are identified from junk mail and where a summary of e-  
mail messages is sent to the user over a network different  
from the network where email-messages are sent, and where  
the recipient of said summary can select a forwarding  
destination for said e-mail messages.

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In the above mentioned prior art documents, methods and  
arrangements are described where information distribution

is handled in certain arrangements of devices based on a limited number of communication paths.

5 The drawbacks of prior art solutions are that they do not provide the service provider with a solution for distributing the necessary information to the users nor do they support any communication from the user to the service provider.

10 The aim of this invention is to overcome the drawbacks of the prior art solutions and to provide a new type of solution for distributing information to closed user groups and also a new type of arrangement for airline information distribution.

15 According to the first aspect of the present invention there is provided a system for distributing information to closed user groups comprising a system server that is connected to Internet, to a GSM network, and to an  
20 external system interface, which is characterized by that the system also comprises means for generating messages according to a profile previously specified by the user, and means for distributing the information to the user, the distribution means having a selection of different  
25 means for sending messages. There is also provided a method for distributing information to closed user groups, which is characterized by that the method comprises the steps of informing the customer in case of a notification using a certain medium, selecting a new medium in case the  
30 customer can not be reached with a certain medium, and repeating the steps of informing the customer and selecting a new medium until the customer is reached or all media are used. Furthermore, there is provided an arrangement for airline information distribution  
35 comprising a system server that is connected to Internet, to a GSM network, and to an external system interface, which is characterized by that the system also comprises means for generating messages according to a profile

previously specified by the user, and means for distributing the information to the user, the distribution means having a selection of different means for sending messages.

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A more complete understanding of the system and method of the present invention may be obtained by the preferred embodiments that follow, taken in conjunction with the accompanying drawings, wherein:

- 10 Figure 1 is an illustrative diagram showing the general architecture of the network arrangement according to the present invention,  
Figure 2 is a block diagram of the network arrangement according to the present invention,  
15 Figure 3 is a flowchart diagram of a method for distributing information to closed user groups according to the present invention using the example of airline information distribution arrangement,  
Figure 4 is an illustrative diagram showing an  
20 arrangement for airline information distribution according to the present invention.

Figure 1 is an illustrative diagram showing the general architecture of the network arrangement according to the  
25 present invention. The network arrangement comprises a GSM network 1, a Public Switched Telecommunications Network (PSTN) 7, Internet 11, server arrangement 17, external system interface 20, user's mobile phone 18 and user's personal computer 19. There can also be an ordinary phone  
30 or a fax within the arrangement.

In the network arrangement the GSM network 1 has a number of Mobile Switching Centers (MSC) 2, a Short Message Service Center (SMS-C) 3, a number of Base Station  
35 Controllers (BSC) 4, and Base Stations (BS) 5 and GSM mobile phones 18. Short Message Service Center (SMS-C) 3 functions as a part of the operator's network used for SMS notification.

GSM network 1 is also connected to the Public Switched Telecommunications Network (PSTN) 7 via switch arrangement 6. PSTN network 7 has several switches, which are marked with reference numbers 8, 9 and 10. Public Switched Telecommunications Network 7 can be used to send voice messages to those who don't own a mobile phone 18.

PSTN network 7 and GSM network 1 are both connected to Internet 11. Internet has several routing devices, which are marked with reference numbers 12, 13, 14, 15 and 16. Internet can be accessed, for example, via a cable television network connection or via PSTN network 7 connection. The server arrangement 17 contains all user specific information and is connected to the GSM network 1, to the Short Message Service Center (SMS-C) 3 and to the external system interface 20.

The user can use a personal computer 19 to access the Internet 11, either via local exchange 10 and PSTN network 7 or a cable television network connection. In an Internet session the user can fill in, and later modify, his/hers service profile stored in the server 17 database. In this service profile the user will specify the conditions in which the server 17 connected to the Internet 11, the GSM network 1 and to the external system interface 20, is to send notifications towards the mobile phone 18 of the user or messages to anybody with a mobile phone or fixed phone.

The system for distributing information to users according to the present invention comprises:

- a system server 17 that is connected to Internet 11, to a GSM network 1 and to an external system interface 20,
- means for generating messages according to a profile previously specified by the user,
- means for distributing SMS-messages to the user,
- means for sending voice messages, which means will handle the communication with the user,

- means for distributing Fax-messages to the user,
- means for distributing Data messages to the user, and
- means for distributing Email-messages to the user.

- 5 Figure 2 is a block diagram of the system for distributing information to users according to the present invention. The system for distributing information to users according to the present invention comprises:
- a central database 21, which stores all notifications  
10 together with their status of distribution,
  - a message database 22, which contains the prepared message e.g. SMS, Voice messages, E-mail, Fax or, Telex messages, that are to be distributed to the different medium,
  - 15 - a SMS message database 23, which contains all incoming notifications and prepared SMS messages that have to be distributed to the requested addresses as well as all the feedback status information received from the user via SMS,
  - 20 - a voice message database 24, which contains the prepared voice messages that have to be distributed and the status of the voice messages,
  - an E-mail message database 25, which contains all prepared E-mail messages that have to be distributed to  
25 the requested addresses as well as all the feedback status information received from the user via E-mail,
  - a Fax message database 26, which contains all prepared Fax messages that have to be distributed to the requested addresses,
  - 30 - a Data message database 27, which contains all prepared data messages that have to be distributed to the requested addresses as well as all the feedback status information received from the user via data messages,
  - a History information database 28, which contains the  
35 history information in regard to users and events,
  - a System info database 29, which contains all system parameters for tuning the system,

- a Personal information database 30, which contains the user specific information such as the user's service description including the templates which are used to generate messages for different medium in different languages,
- a third party interface 31, which connects the system to an external system,
- a third party application database 32, which contains the information of an external system,
- a unit for classifying and updating history information 33, which stores the updated information to the history information database 28,
- a message generator 34, which selects a notification from the Central database 21, creates a new message for distribution by one of the selected media, and stores the prepared message in the Message database 22 for further distribution,
- a message sender 35, which selects the available messages from the Message database 22 and distributes the different messages types to the different distribution media,
- a SMS sender 36, which distributes SMS-messages to the user,
- a SMS receiver 37, which receives SMS-messages from the user,
- a Voice Response Unit (VRU) sender/receiver 38, which handles inbound calls as well as outbound calls, that are handled according to the information stored in the voice message database 24,
- an E-mail sender 39, which distributes E-mail messages to the user,
- an E-mail receiver 40, which receives E-mail messages from the user,
- a Fax message sender 41, which distributes Fax-messages to the user,
- a Data message sender 42, which distributes Data messages to the user,

- a Data message receiver 43, which receives Data messages from the user,
- a message status handler 44, which reads out new information received in the medium databases for registration purposes to provide feedback for system and the Central database 21, and
- a Presentation layer 45, which is used to maintain and monitor the service and as an interface for accessing all databases and processes.

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When the system according to the invention receives updated information that is to be distributed to a closed user group, this information is stored directly or via a human agent in a local database. The database contains information about the users and also contains the user specific service description, describing the personal data of a user with the different medium like GSM-number, SMS or Fax-number to contact him.

Based on the new messages stored in the Central database 21, the message generator 34 is triggered. The message generator 34 is the application to translate the information from the Central database 21 into the message database 22. The message generator 34 is a process that will run on the Administration server. The message generator 34 is a continuous process that will request the Central database 21 to get the next notification. The message generator 34 selects the next notification to be processed from the Central database 21 and creates a message based on the notification information and the related template information for the correct distribution medium indicated by the user. For example when preparing an SMS message, the message generator 34 reads the notification message from the Central database 21 and creates an SMS message based on the notification message and the user specific SMS-template stored in the Personal information database 30. The message generator 34 stores the result in the Message database 22.



The prepared message is stored in the Message database 22 for distribution. The message sender 35 distributes the messages stored in the Message database 22 to the database 23-27 of the right medium. Based on the system parameters stored in the System info database 29 this medium 36, 38, 39, 41, 42 will try for a certain time-period to get in contact with the user to inform him. The message sender 35 is a separate process and works in parallel to the message generator 34. In this way new media can easily be added, without changing the complete system. The message sender 35 is a process that will run on the Administration server. The Message sender 35 is a permanent process that will read the Message database 22 on information to pass through. The application will read and remove the next message from the Message database 22 based on the First In, First Out (FIFO) principle and place it in the right medium Message database 23-27.

If the user can not be contacted or does not confirm the message in time, the Message status handler 44 will remove the message from the Medium database 23-27 and will ask the Message Generator 34 to generate a message of a different medium to contact this particular user. The Message status handler 44 is a permanent process that will read the Medium databases 23-27 and System Info database 29 on information to pass through to Central database 21.

The Presentation layer 45 can be used to handle and present all requested management information and can also be used to measure the performance of the overall system. By adjusting the system parameters stored in the System Info database 29, the Presentation layer 45 can be used to test different System Configurations.

Figure 3 is a flowchart diagram of a method for distributing information to closed user groups according to the present invention using the example of airline

information distribution arrangement. In the method there is first a notification 46 that will start the procedure. For example, in case of a cancellation, delay or rescheduling of a flight the airline wants to inform the customer and when possible offer him an alternative flight 47. There is an occurrence message 48 delivered to the customer. In case the customer is not reached and the message is still relevant 49, the message will be distributed again 50 to the customer.

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The system tries to contact the user using a certain medium. When the customer can not be reached with a certain medium there will be a new medium selected 51. The system will continue to contact the customer again 53, until the medium is out of time 54. Then, if the customer is not reached again and the message is still relevant 49, there will be a new medium selected 51. In case that all media are used there is a status message 52 stating that the customer could not be reached. In the case where the user can be contacted, the user is requested to confirm the proposed alternative flight arrangement 55. The reservation will be then made accordingly 56.

In the case where an alternative flight is confirmed by the user 55, the confirmation should be registered within the booking system 57. Where the confirmation is handled within the booking system 57, the user will receive a confirmation message 59. Otherwise, the user will be informed about the problems with the confirmation 58 and will be offered when possible another alternative.

Figure 4 is an illustrative diagram showing an arrangement for airline information distribution according to the present invention. The airline information distribution arrangement according to the invention comprises a system server 17 that is connected to Internet 11, to a GSM network 1 and to an external system interface 20. The airline information distribution arrangement also

comprises a means for checking messages according to a profile previously specified by the user, a means for generating messages, and a means for distributing the information to the user having a selection of different  
5 means for sending messages.

The arrangement initiates when a notification is sent ① from the external system 20 to the system server 17. The system server 17 will then send ② a notification and an  
10 alternate flight offer over the GSM network 1 as an SMS-message to the customer 18. In case there is no response from the customer 18, an alternative medium is selected according to the user profile. Next, there is an E-mail message sent ③ to the customer's personal computer 19. If  
15 there is still no response from the customer 19, a third alternative medium is selected according to the user profile. As a third notification there will be a Voice message sent ④ to the GSM terminal 60 of the customer's secretary. When the customer's secretary 60 confirms ⑤  
20 the alternative flight booking a confirmation will be sent ⑥ back to the GSM terminal 60 of the customer's secretary. The above mentioned process is an example and the means of communication and the order of communicating is configurable.

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The user can specify the conditions, in which the system server 17 will send notifications towards the user, and how the notifications are to be performed. The user can access the Internet page of the service provider and enter  
30 the notification information to his specific user profile. The user 19 can also select to whom 60 ⑤ the notifications are sent to. The user can also select the service to be charged via the phone bill.

35 The airline can receive updated flight information that a certain flight is cancelled, delayed or has had a schedule change. This information is stored directly or via a human agent in a local database. The database contains

information about which passengers are booked on a certain flight and also contains the service description of all passengers, describing the personal data of a user with the different media like GSM-number, SMS, Fax-number, E-mail or telex to contact the user.

When the user is contacted, he is informed and given the possibility to either confirm the message or to be connected to a helpdesk agent for further information. In case a proposed alternative flight is accepted, the Message Status Handler and Confirmation Handler will check the local database whether the proposed alternative flight is still available. The application on the database will compose a message to confirm the registration to the user that is handled via the overall described procedure.

As feedback to the system the user can respond on several alternatives for a change in flight, request for refund of money, request for connecting to the helpdesk, or request for repeating the message. The messages are first of all selected on priority and secondly on time so that the sending of important message can be secured even in the case of high traffic loads.

System solution according to the invention is flexible and scaleable because of the modular, process oriented design. System has a secure and easy connection to the network by using an open architecture.